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MISSOURI BOTANICAL GARDEN BULLETIN

Vol. VI JANUARY, 1918 No. 1

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ST. LOUIS, MO.
1918
PUBLISHED MONTHLY BY THE BOARD OF TRUSTEES

SUBSCRIPTION PRICE:
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BOARD OF TRUSTEES
OF THE MISSOURI BOTANICAL GARDEN

THE ORIGINAL MEMBERS WERE DESIGNATED IN MR. SHAW'S WILL, AND THE BOARD SO CONSTITUTED, EXCLUSIVE OF THE *EX-OFFICIO* MEMBERS, IS SELF-PERPETUATING.

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President of the Board of Education of St. Louis.

DANIEL S. TUTTLE,
Bishop of the Diocese of Missouri.

ROLAND W. SWITZER, Secretary.

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Missouri Botanical Garden Bulletin

Vol. VI St. Louis, Mo., January, 1918 No. 1

REPORT OF THE OFFICERS OF THE BOARD

To the Board of Trustees of the Missouri Botanical Garden:

We submit for your consideration a statement of the financial transactions for the year ending December 31, 1917.

The results during the year have been satisfactory, the vacancies amounting to only $1,845.25, and the income from rentals, royalties, and interest exceeding that of 1916 by $8,192.23. At the present time we have only two vacant buildings, the total rentals of which were $1,320.00 per year.

A one-story brick addition was erected in the rear of the stores, Nos. 816-18 North Grand Avenue, at a cost of $1,848.82, increasing the rental $420.00 per annum. During the year a new building was erected at the southeast corner of Seventh Street and Washington Avenue, at a cost to the lessee of $75,000.00, and the lease extended for a term of ten years from March, 1929.

The tract of land west of Tower Grove Avenue, known as Shaw's Vandeventer Avenue Addition, has been improved, with the exception of that portion west of Newstead Avenue, which contains about 2,100 front feet. This improvement will embrace the making of Alfred Avenue, a street about 450 feet long and 50 feet wide, a sewer system for blocks 4 and 5, and some 435 feet of sidewalk on the south side of Lafayette Avenue, the total cost approximating $7,000.00.

Sales of residence property during the year were as follows:

Lafayette Avenue Addition . .	1,220 front feet .	$40,010 00
Arsenal Street Addition . . .	105 front feet .	4,065 00
Vandeventer Avenue Addition .	1,152 front feet .	36,000 00
		$80,075 00

A new residence was erected at the Garden for the use of the engineer, at a cost of $4,087.03, and general improvements were made in the Garden, costing $13,759.62.

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Three of the bequests provided for in Mr. Shaw's will have been carried out—the annual Flower Sermon, the appropriation for the St. Louis Flower Show, and the Gardeners' Banquet.

For an itemized account of receipts and disbursements your attention is called to the following statement:

INCOME:		
Rentals		$162,691 65
Interest and dividends		17,893 10
Royalties received		9,448 30
Total income		$190,033 05
LESS — ADMINISTRATION AND UPKEEP EXPENSES:		
Commissions on bonds	$ 967 50	
Heating and janitor service	807 09	
Insurance	5,597 51	
Interest paid	547 50	
Legal expenses	1,086 65	
Miscellaneous expenses	1,698 94	
Office salaries and expenses	5,260 52	
Repairs	6,465 78	
Water license	635 64	
Taxes	37,170 81	60,237 94
		$129,795 11
LESS — ANNUAL BEQUESTS:		
Annual Flower Sermon, Gardeners' Banquet and Trustees' Banquet		1,600 00
Amount available for upkeep of Garden		$128,195 11
DISBURSED AS FOLLOWS:		
Garden account	$58,381 05	
Herbarium	7,153 99	
Library	4,813 02	
Research and instruction	15,487 15	
Garden office	10,931 13	96,766 34
		$31,428 77
LESS—GARDEN IMPROVEMENTS		19,922 55
Excess income over expenditures for the year ending December 31, 1917		$11,506 22

Respectfully submitted,

EDWARDS WHITAKER, President.

Attest:

R. W. SWITZER, Secretary.

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TWENTY-NINTH ANNUAL REPORT OF THE DIRECTOR

Gentlemen:

I have the honor to submit herewith the twenty-ninth annual report of the Director.

Perhaps the improvement of greatest importance at the Garden during 1917 has been the reconstruction of the Garden between the main gate and the palm house, with the accompanying rearrangement of the water gardens here, they now being in the form of permanent concrete pools of dignified design. This very necessary improvement has necessitated a great amount of grading, the removal of over 1,500 cubic yards of soil, the removal of old and construction of new and more direct walks, the laying of new drains, etc. A number of large trees have been transplanted to this area, including two ginkgos, several liquidambars, and thirty fine specimens of *Magnolia grandiflora,* as well as many small junipers and other conifers, and a hedge of barberry, extending from the main gate to the palm house.

As a part of this general scheme, a new rose garden has been established to the south of the Linnean house, on the site formerly occupied by the old greenhouses, removed in 1916. Practically all the plants from the old rose garden near the administration building have been transferred to this new location, and a great many new varieties added, as well as additional roses which have been proved to be hardy in St. Louis. The new location will undoubtedly make this—one of the most popular attractions at the Garden—much more accessible to the public. The garden has been enclosed with a planting of several hundred hawthorns, which will materially add to its beauty in both spring and fall. All of this has undoubtedly been well worth while, since the incorrectness of the grade has been an eyesore to all observers, and the dignity of the new formal approach to the conservatories impresses the visitor at once on entering the main gate.

Work begun on the economic garden in 1916 has been continued throughout the year. A walk and flight of steps from the economic house to this garden have been built, four pools have been completed, and permanent planting installed, including a collection of shrubs, sample grass plots, cordon fruit trees, and birches for pleached alleys.

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During the summer plots of farm crops of all sorts were shown, as well as collections of flowering plants, vines, etc. This garden as a whole is now taking on a finished appearance and is proving extremely valuable as a demonstration of what may be grown in the vicinity of St. Louis.

Many improvements have been made in other parts of the Garden, the two most notable being the construction of a house for the engineer and the building of a pit for the storage of coal. The engineer's house, completed in November, is a six-room brick structure, with all modern conveniences. A great amount of filling was necessary to bring this site up to grade, but the house, while facing Shaw Avenue at the west end of the stone wall, is very near to the boiler house, thus adding both to the convenience of the engineer and safety of the Garden. A new water connection was brought in from Shaw Avenue to supply this house, as well as to provide much-needed additional water for the propagating houses. A storage pit with a capacity of 25 to 30 cars of coal has been practically completed during the year. The construction of this pit has been a slow process, since it is all of reinforced concrete and was built in sections.

Much time has been devoted to the building of new walks where they seemed desirable. The main conservatories have been painted both outside and inside, and the stone wall on Shaw Avenue has been pointed. In the fern house a new concrete bridge with porous rock trim has been built, replacing the rustic bridge, which had become unsafe. The interiors of the new shops and other service buildings have been completed, involving the construction of benches, lockers, racks, and necessary fittings in paint and glass storage houses.

Articles in the February, April, and May BULLETINS on back-yard gardens and window boxes, vegetable gardens, canning, drying, and storage of vegetables, created an unprecedented demand for these numbers. Over 40,000 copies of the February number alone have been reprinted and distributed by the St. Louis Art League and the National Clean-Up Association, while articles from the April and May issues were widely copied by other publications throughout the country. In addition to this means of assisting the public, members of the staff and the garden pupils devoted much time, during the summer, to superintending school vegetable gardens and those promoted by the Food Conservation Committee, as well as answering many calls for information along these lines, by mail and telephone.

Opportunity was given early in the spring to employes of the Garden to raise vegetables for their personal use on plots

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prepared by the Garden. Garden tools were also loaned for this purpose, and many were glad to avail themselves of this assistance, who otherwise would have been unable to have had a vegetable garden. Unusual quantities of corn, oats, millet, alfalfa, soy beans, cow-peas, and cane were grown during the summer. Over 500 bushels of corn were harvested and sufficient hay to more than supply our stock for the coming year. A new roof was built on the walls of the old hay barn to provide storage room for the large crop.

The floral displays have been maintained throughout the year in their usual excellence. These shows continue to attract more and more attention from local commercial growers and florists, since the Garden is able to show many novelties before they are on the open market. March 15-18 the St. Louis Florists' Club held a flower show in the Coliseum, which was the most successful thing of its kind attempted in St. Louis in several years. The Shaw medal was offered by the Garden as well as $500 dollars in premiums. Nineteen first prizes were obtained by the Garden in addition to the silver medal offered by the Society of American Florists and Ornamental Horticulturists.

The use of the Garden has been offered to the Government in whatever capacity seems most fit, together with the equipment of the laboratories, sterilizing apparatus, etc. The Garden has also been of considerable assistance to the Missouri Library Commission, in the collection of books and magazines to be forwarded to the army cantonments. Information furnished by the Garden to meet the demand arising through the shortage of certain drugs, fibers, dyes, etc., due to the war, has even exceeded the amount given out in 1916.

ATTENDANCE FOR THE YEAR 1917

	Week-days	Sundays
January	3,887	2,913
February	3,885	3,095
March	6,205	5,984
April	9,624	13,794
May	17,943	10,332
June	9,128	19,003
July	10,860	7,570
August	14,508	9,729
September	12,211	14,432
October	11,133	15,272
November	38,744	29,751
December	5,470	3,981
	143,598	135,856
		143,598
TOTAL		279,454

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ANNUAL BEQUESTS

The Flower Sermon, provided for in the will of Mr. Shaw, was preached in Christ Church Cathedral by the Rev. James E. Freeman, of St. Mark's Church, Minneapolis, Minnesota, on May 13, 1917.

The Twenty-eighth Gardeners' Banquet was held on the evening of September 12, 1917, at the Mercantile Club, members of the American Association of Park Superintendents, then meeting in St. Louis, being guests of the evening.

SCHOOL FOR GARDENING

Through graduation and the call to arms by the Government, the attendance of the School for Gardening has decreased. Miss Clara Fuhr, Mr. Clarence Pedlow, Mr. P. A. Kohl and Mr. A. J. Cella completed their course in September and were awarded the Garden certificate. Miss Fuhr is employed temporarily at the Bourdet Floral Company; Mr. Pedlow is a draftsman and outdoor foreman for Mr. C. W. Fullgraff, landscape architect; Mr. Kohl has been appointed Assistant Supervisor of School Gardens in St. Louis; Mr. Cella is in charge of the landscape department of Stark Nursery Company, at St. Louis.

Three of the students have entered the army service. Mr. James Monteith is corporal of Headquarters Company of 128th Field Artillery, now at Camp Doniphan; Mr. George Pedlow is a marine stationed "somewhere" in France; Mr. W. G. Ellis is corporal of Battery C, 345th Field Artillery, Camp Travis.

Due to the resignation of Mr. W. W. Ohlweiler, several of the courses given by him were taken over by other members of the instruction staff, the course in soils and fertilizers being given by Mr. C. L. Moody.

During the spring and summer campaign for thrift gardens, the students aided the Women's Food Conservation Committee in the work of organization. At the same time Miss Clara Fuhr was engaged by the Webster Groves Garden Club to take charge of school gardens in that town and achieved very favorable results.

As a result of competitive examinations, Miss Anne L. Chase of St. Louis, Mr. R. D. Mitchell of Gotha, Florida, and Mr. F. C. Harris of Coffeen, Illinois, were appointed to the vacant scholarships. Miss Virginia McMath of Webster Groves is also enrolled in the regular course.

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A course of eight lectures on "The Development of a Small Place" has been arranged for the benefit of amateur gardeners, and treats in detail the various theoretical and practical phases of designing, developing and maintaining a small estate. Several women have been enrolled by the payment of a nominal tuition fee.

RESEARCH AND INSTRUCTION

Graduate instruction in botany offered in connection with the Shaw School of Botany of Washington University, and conducted in the graduate laboratories of the Garden, reached a maximum during the latter part of 1916-17. The operation of the federal draft and the great demand for men in the research and instructional departments of the agricultural colleges and experiment stations have together reduced materially the enrollment in graduate work for 1917-18. This has made it desirable and necessary to depart somewhat from the announced program of courses of instruction. At the same time it has given members of the staff greater opportunity to devote themselves to other phases of the work made more urgent by the conditions. Coöperating with the departments of Washington University, the facilities of the laboratories have been offered for the solution of problems confronting business firms in the city and vicinity, directly or indirectly engaged in the manufacture of war products. Much interest has been manifested in this opportunity. In addition, the members of the scientific staff, as well as those of the Garden staff, have given considerable attention to the work of increased production and of conservation of vegetable products. This has required an increased number of lectures, conferences, personal inspection of fields and gardens, and much correspondence.

Scientific and Extension Lectures.—The following are the more important given by members of the scientific and Garden staffs during 1917:

Alexander Lurie, January 19, before the Mothers' Club of the Benton School, "Outdoor Flowers."

George T. Moore, February 1, before the Phi Gamma Delta Fraternity, "The Garden and the Town."

George T. Moore, February 7, before the Wednesday Club, "New Fruits and Vegetables for the St. Louis Market."

George H. Pring, February 13, before the St. Louis Aquarium Society, "Native Aquatic Plants Adapted to Aquaria."

Alexander Lurie, February 16, before the Mothers' Club of the Devonshire School, "Back-yard Gardens."

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Alexander Lurie, March 13, before the Webster Groves Garden Club, "Hot-beds."

B. M. Duggar, March 16, before the Alumni Association of the Washington University Dental School, "Some Phases of Parasitism and Immunity in Plants."

Alexander Lurie, March 16, before the St. Louis Flower Show, "Back-yard Gardens."

George H. Pring, March 16, before the St. Louis Flower Show, "Aquatic Plants for St. Louis."

George T. Moore, March 27, before the Washington University Association, "Some New and Old Plant Industries."

B. M. Duggar, April 7, before the Washington University Chapter of Sigma Xi, "Some Materials and Problems in Plant Pathology."

Alexander Lurie, April 10, before Butler Bros.' Employes' Association, "Vegetables."

Alexander Lurie, April 10, before Richmond Heights School Patrons' Association, "Vegetables."

W. W. Ohlweiler, April 19, before the Boy Scouts, at Knights of Columbus Hall, "Vegetable Gardening."

P. A. Kohl, April 20, before the Boy Scouts, at St. Peter's Evangelical Church, "Vegetable Gardening."

Alexander Lurie, April 20, before the Boy Scouts, at Bryan Mullanphy School, "Vegetable Gardening."

Alexander Lurie, April 20, before the Rose Fanning School, "Flower Gardens."

Clarence Pedlow, April 20, before the Boy Scouts, at Kingshighway Presbyterian Church, "Vegetable Gardening."

George H. Pring, April 20, before the Boy Scouts, at St. Peter's Episcopal Church, "Vegetable Gardening."

J. M. Greenman, April 23, Public Lecture Course of Washington University, "The Flora of the High Rockies."

B. M. Duggar, April 30, Public Lecture Course of Washington University, "The Plant Life of the Desert."

Alexander Lurie, May 4, at the Kirkwood City Hall, "Questions on Vegetables."

George T. Moore, May 4, at the Kirkwood City Hall, "Vegetables."

George T. Moore, May 10, before the McKinley High School, "Some Applied Aspects of Botany."

Alexander Lurie, May 14, at Webster Groves, "Questions on Vegetables."

George T. Moore, May 16, before the St. Louis College of Pharmacy, at Sheldon Memorial, valedictory address.

George H. Pring, June, before the St. Louis Association of Gardeners, "Development of Hybrid Nymphaeas."

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Alexander Lurie, October 26, before the Household Science Club of Belleville, at the Carnegie Library, "The Storage of Vegetables."

Hermann von Schrenk, November 13, before the Kirkwood Monday Evening Club, "My Summer in the Garden."

George H. Pring, November 22, before the St. Louis Gardeners' Association, "The Botanic Gardens, Kew, England."

George T. Moore, November 26, Public Lecture Course of Washington University, "The Evolutionary Consequences of the War."

George H. Pring, December 6, before convention of National Gardeners' Association, Chicago, "The Botanic Gardens, Kew, England."

George H. Pring, December 12, before convention of Missouri Horticultural Society, Kansas City, "Aquatic Gardens."

Graduates, Fellows and Investigators.—During the season of 1916-17 there were registered for graduate work sixteen students, as follows: Ruth Beattie, instructor in botany, Wellesley College; W. W. Bonns, Rufus J. Lackland Research Fellow; C. W. Dodge, Lackland Research Fellow; Lucy D. Foote, teacher, St. Louis Public Schools; G. W. Freiberg, formerly research assistant; I. C. Hoffman, industrial fellow, Purdue University; H. M. Jennison, assistant in botany, Washington University; A. Lurie, horticulturist, Missouri Botanical Garden; D. C. Neal, Lackland Research Fellow; Alice Pickel; L. J. Pessin, Lackland Research Fellow; W. S. Reeves, scientific assistant to the Director; H. Schmitz, Lackland Research Fellow; J. W. Severy, teaching fellow, Washington University; R. A. Studhalter, assistant bacteriologist, Montana Agricultural Experiment Station; S. M. Zeller, special research assistant, Yellow Pine Association. Owing to the operations of the draft, to voluntary enlistment in public service, and to the great demand for scientific men in botanical and agricultural work, the number of students has been reduced for the season of 1917-18, and the following are registered for regular graduate work: W. W. Bonns, Anne W. Davis, C. W. Dodge, Lucy D. Foote, H. M. Jennison and E. B. Payson. In addition, the following visiting investigators have been in residence, using the facilities of the graduate laboratory, namely, Dr. E. R. Allen and Dr. S. M. Zeller.

Appointments to the Rufus J. Lackland fellowships for 1917-18 were made prior to the entrance of the United States into the war, with the following result: W. W. Bonns, S. B. Massachusetts Institute of Technology, 1899, B. S. A. Cornell University, 1909, reappointed third year; W. H. Cham-

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bers, B. S. University of Illinois, 1915; C. W. Dodge, A. B. Middlebury College, 1915, reappointed third year; D. C. Neal, B. S. Mississippi Agricultural and Mechanical College, 1909, A. M. Washington University, 1916, reappointed second year; H. Schmitz, B. S., 1915, and M. S., 1916, University of Washington, reappointed second year.

Other appointments included that of Anne W. Davis, A. B. Bryn Mawr, 1917, research assistant, to succeed Dr. G. W. Freiberg; of J. W. Severy, A. B. Oberlin College, 1915, and E. B. Payson, B. A. University of Wyoming, 1917, teaching fellows in Washington University; and of W. S. Reeves, B. S. Pomona College, 1915, scientific assistant to the Director.

Graduates formerly connected with the laboratory and terminating their connection during the calendar year for educational or scientific work are as follows: Dr. G. W. Freiberg, Messrs. W. S. Reeves and J. W. Severy, now in the Washington University Base Hospital, Unit 21, France; I. C. Hoffman, assistant horticulturist, Bureau of Plant Industry and Purdue Experiment Station; H. M. Jennison, assistant professor of botany, Montana Agricultural College; D. C. Neal, pathologist, citrus investigations, United States Department of Agriculture, Alabama Experiment Station; H. Schmitz, Naval Reserves; R. A. Studhalter, forest pathologist, United States Department of Agriculture; S. M. Zeller, investigator, Yellow Pine Association, stationed at the Missouri Botanical Garden.

Mr. W. H. Chambers was unable to report for a fellowship and is now enlisted in the Sanitary Corps of the United States Army.

Dr. E. R. Allen, associate in the Ohio Agricultural Experiment Station, in charge of the department of soils and of soil chemistry, has been granted a leave of absence for the academic year by the station to pursue investigations in the graduate laboratory. He has also been appointed associate in biological chemistry in the Washington University Medical School.

At the commencement of Washington University, June 14, degrees were conferred on the members of the graduate laboratory as follows: Doctor of Philosophy, G. W. Freiberg, with a thesis on "Studies in the mosaic diseases of plants," and S. M. Zeller, thesis, "Lenzites saepiaria Fries, with special reference to enzyme activity." The degree of Master of Arts was conferred on three students as follows: Ruth Beattie, thesis, "Temperature relations of enzymes, with special refer-

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ence to the effects of various temperatures upon the formation of glucose from starch by the action of diastase"; Alice Pickel, thesis, "A taxonomic study of the genus Tetradymia"; and R. A. Studhalter, thesis, "The factors involved in the dissemination of the chestnut bark disease."

Publications and Papers.—There are given below a list of the more important papers published during the year as a result of investigations and observations made in the laboratories, herbarium and Garden. This list does not include many briefer popular discussions, articles which have appeared in the BULLETIN, and abstracts in scientific journals.

Bryan, Mary M. "A Spurless Variety of Habenaria psycodes." Ann. Mo. Bot. Gard., 1917.

Burt, E. A. "Merulius in North America." Ann. Mo. Bot. Gard., 1917.

Burt, E. A. "Odontia Sacchari and O. saccharicola, New Species on Sugar Cane." Ann. Mo. Bot. Gard., 1917.

Burt, E. A. "The Thelephoraceae of North America. VIII." Ann. Mo. Bot. Gard., 1917.

Duggar, B. M., Severy, J. W., and Schmitz, H. "Studies in the Physiology of the Fungi. IV. The Growth of Certain Fungi in Plant Decoctions." Ann. Mo. Bot. Gard, 1917.

Duggar, B. M., Severy, J. W., and Schmitz, H. "Studies in the Physiology of the Fungi. V. The Growth of Certain Fungi in Plant Decoctions." Ann. Mo. Bot. Gard., 1917.

Duggar, B. M. "Botany." American Year Book, 1916.

Freiberg, G. W. "Studies in the Mosaic Diseases of Plants." Ann. Mo. Bot. Gard., 1917.

Gates, R. R. "A Systematic Study of the Genus Trillium, Its Variability and Its Relation to Paris and Medeola." Ann. Mo. Bot. Gard., 1917.

Greenman, J. M. "Monograph of the North and Central American Species of the Genus Senecio—Part II." Ann. Mo. Bot. Gard., 1917.

Greenman, J. M. "Two Exotic Compositae in North America." Ann. Mo. Bot. Gard., 1917.

Moore, G. T. "Algological Notes. I. Chlorochytrium gloeophilum Bohlin." Ann. Mo. Bot. Gard., 1917.

Moore, G. T. "Algological Notes. II. Preliminary List of Algae in Devils Lake, North Dakota." Ann. Mo. Bot. Gard., 1917.

Noyes, J., and Duggar, B. M. "Gardens of St. Louis." Art League Bull., 1917.

Pring, G. H. "Hybrid Nymphaeas." Ann. Mo. Bot. Gard., 1917.

Zeller, S. M. "Studies in the Physiology of the Fungi. III. Physical Properties of Wood in Relation to Decay In-

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duced by Lenzites saepiaria Fries." Ann. Mo. Bot. Gard., 1917.

The following papers were presented before the Botanical Society of America during convocation week of the American Association for the Advancement of Science, at Pittsburgh, December 28 to January 1:

B. M. Duggar and Anne W. Davis. "The Disinfection of Seed for Pure Culture Work."

B. M. Duggar and C. W. Dodge. "The Use of the Colorimeter in Hydrogen-Ion Determinations of Culture Solutions and Plant Juices by the Indicator Method."

George T. Moore. "The Subterranean Algal Flora."

George T. Moore. "A Wood Penetrating Alga."

S. M. Zeller and C. W. Dodge. "Rhizopogon in North America."

HERBARIUM

Continued progress has been made in the herbarium during the year. A relatively large amount of new material has been acquired; and another room on the third floor of the office building has been equipped with the much-needed steel cases, which give sufficient capacity to accommodate all of the gymnosperms, including the valuable collections of Coniferae from the Engelmann herbarium.

New Accessions.—The private herbarium of Mr. John H. Kellogg, consisting of upwards of 12,000 specimens, has been acquired by purchase. This collection consists primarily of plants from Missouri, Arkansas and Texas, but also contains several sets of plants from various parts of the United States, which were obtained by Mr.Kellogg through exchange with correspondents. Among other important accessions secured during the year are the following: From Dr. Adolf Alt, 65 plants of Switzerland; E. Bartholomew, 300 "Fungi Columbiani," and 100 "North American Uredinales"; Bernice Pauahi Bishop Museum, 420 plants of the Hawaiian Islands; Miss Florence Beckwith, 87 plants of Missouri, Illinois and Kansas; Dr. R. P. Burke, 266 specimens of fungi of Alabama; B. F. Bush, 213 plants of Missouri; California Academy of Science, 398 plants of the Galapagos Islands, and 74 plants of California; Canton Christian College, 835 plants of southern China; F. S. Collins, 100 "Phycotheca Boreali-Americana"; Ira W. Clokey, 1,205 plants of Colorado, Texas, Utah, Nevada, Mexico, etc.; Prof. C. Conzatti, 70 plants of Mexico; D. L. Crawford, 217 plants of California; Rev. John Davis, 1,164 plants, chiefly from Missouri and South Carolina; J. A. Drushel, 107 plants, mainly

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from Missouri; Dulau & Co., 660 specimens of Gottsche and Rabenhorst's "Hepaticae Europaeae"; Dr. W. G. Farlow, 461 specimens of algae, lichens and fungi; Mrs. R. S. Ferris, 112 plants of California; Field Museum of Natural History, 731 plants of central and western United States; G. W. Freiberg, 573 plants of Washington; Gray Herbarium of Harvard University, 915 plants, chiefly from Newfoundland, eastern and southern United States; Dr. Homer D. House, 204 specimens of Thelephoraceae and other fungi of New York; E. L. Johnston, 105 plants of Colorado; P. Jörgensen, 342 plants of the Argentine Republic; Dr. W. H. Long, 94 timber-destroying fungi; Dr. C. F. Millspaugh, 143 plants of Yucatan; Prof. Aven Nelson, 420 plants of Alaska and 907 plants of Idaho; New York Botanical Garden, 1,196 specimens from various parts of North America, Bermuda and the West Indies; Dr. L. O. Overholts, 107 specimens of fungi of Colorado and Pennsylvania; Edwin B. Payson, 451 plants, mainly from Colorado and Wyoming; Philadelphia Academy of Natural Sciences, 451 plants of Delaware; Dr. H. von Schrenk, 253 specimens, chiefly from the herbarium of Prof. Joseph Schrenk; P. C. Standley, 95 plants of Florida; Dr. Forrest Shreve, Compositae and Euphorbiaceae from Arizona; J. A. Stevenson, 57 specimens of fungi from Porto Rico; H. Sudre, 50 specimens of Rubus and 50 specimens of Hieracium from France; United States National Museum, 469 plants from various parts of North America and 375 plants from the Canary Islands; University of Texas, 126 plants of Texas; Charles T. Vorhies, 117 plants from northern Arizona; Dr. S. M. Zeller, 475 plants of Washington. A complete list of accessions received each month of the year has been recorded in the successive issues of the BULLETIN.

Mounting and Distribution.—The mounting of herbarium specimens has continued throughout the greater part of the year, and a large part of the material received on new accessions has been mounted and inserted in the organized herbarium. Several thousand miscellaneous undetermined specimens, accumulated during previous years, have been identified and distributed. In addition to this, nearly 1,500 specimens from the private herbarium of Dr. A. W. Chapman, which was purchased several years ago, have been mounted and incorporated in the general collection.

Field Work.—The botanical survey of the southwest in coöperation with the Arnold Arboretum of Harvard University has been pursued throughout the entire season, except for the last two weeks in August; and the collector, Mr. Ernest J. Palmer, has visited numerous localities in Texas,

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Oklahoma and Arkansas. Spring and summer collections were made on an itinerary beginning early in March, continuing until early August, and embracing the following stations which were visited essentially in the order enumerated: Corpus Christi, Campbelton, Alice, Laredo, Cotulla, Uvalde, Pulliam, Del Rio, Devils River, Alpine, San Angelo, Brownwood, Houston, Dayton, Livingston, Boerne, Kerrville, Sabinal, Utopia, Concan, San Marcos, Blanco, Boerne, San Antonio, Sullivan, Kingsbury, Milano, Somerville, Quarry, College Station, Bryan, Valley Junction, Milano, San Saba, Brady, Menard, Brownwood, Houston, Morgans Point, Goose Creek, Dayton, Livingston, Huntsville, Latexo, Grapeland, Palestine, San Marcos, Manchaca, Buda, Blanco, Fisher's Store, Lacey's Ranch, Boerne, Medina Lake, Uvalde, Pulliam, Montell, Barksdale, Del Rio, Devils River, Brownwood, San Angelo, Mertzon, Sweetwater, Blackwell, Fort Chadburn, Big Spring, Lubbock, Amarillo, and Canyon, in Texas; Clinton, Elk City, Snyder, Cache, Anadarko, Lawton, Ryan, and Ringold, in Oklahoma; Denison, in Texas; Mena, in Arkansas; Page, in Oklahoma, and Allenton, in Missouri.

About two weeks in midsummer Mr. Palmer spent in sorting and labeling the plants secured during the early part of the season. On September 1, collecting was resumed at Fulton and McNab, Arkansas, and continued at San Augustine, Beaumont, Fletcher, Houston, Liberty, Dayton, Livingston, Palestine, Latexo, Grapeland, Blanco, San Marcos, Boerne, San Antonio, Pleasanton, Coraleta, Sabinal, Utopia, Comstock, Del Rio, Uvalde, Montell, Brownwood, Sweetwater, Big Spring, in Texas, and at Altus, Elk City, Snyder, and Muskogee, in Oklahoma. Thus a splendid representation of both the vernal and autumnal flora was obtained.

Although the season on the whole was an exceptionally dry one and collecting therefore more difficult than in the three years preceding, yet upwards of 10,000 specimens were obtained. These collections afford excellent material for scientific study, especially in tracing the geographical range of species and in throwing more light on many species about which very little at present is known. Seeds of a number of plants were secured, particularly of such plants as seem of special interest for growing in the garden.

Distribution of Duplicates.—A relatively small number of duplicate herbarium specimens has been distributed to correspondents during the year. However, 2,572 specimens have been forwarded chiefly to American institutions on the basis of exchange; and in return therefor several valuable series of plants have been received.

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Use of Herbarium by Outside Botanists.—Visiting botanists from different parts of the country have consulted the herbarium from time to time during the year. Several loans of herbarium specimens have been made to institutions in order to facilitate the work of specialists in monographing technical groups of plants, and in studying the detailed flora of different parts of the country. Such loans for the most part have been of mutual advantage. An important work has been undertaken by Dr. Norma E. Pfeiffer of the University of North Dakota, who spent the month of July in the herbarium in pursuance of a monographic study of Isoetes.

Statistical Summary: (For the year ending December 31, 1916).

Number of specimens acquired on new accessions:			
By purchase	19,070		
By gift	5,556		
By exchange	3,489		
By field work	8,537		
Total	36,652	valued at	$3,665 20
Number of specimens mounted and incorporated:			
From Chapman Herbarium	1,485		
From all other sources	15,860		
Total	17,345	valued at	$3,469 00
Number of specimens discarded from the herbarium	136		
Number of specimens sent to correspondents on the basis of exchange	2,582		
Number of specimens in organized herbarium	820,772	valued at	$123,983 05
Number of specimens in unorganized herbarium (estimated at)	62,000	valued at	5,080 00
Wood specimens, etc., supplementing the herbarium		valued at	280 00
Microscope slides, etc		valued at	410 00
Total valuation			$129,753 05

LIBRARY

Since the Garden library receives annually 944 serial publications containing more or less botanical matter, a large part of the daily work is required for checking up and entering the current numbers of these publications as they arrive, sending them on the round of the laboratories, collating the volumes for the binder and finally indexing and distributing them on the shelves.

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There have been even fewer opportunities than in former years during the war to purchase books which will complete sets in old serials lacking one or more volumes.

Reclassification of Books.—Work has been continued during the year in making changes in the card catalogue and in accession slips in the vault, which were made necessary by reclassification in 1915 of the books and pamphlets in the sections of plant physiology and plant pathology, but this work is not yet completed. About 1,000 more subject cards were prepared during the year to complete the entries in the library section of mycology for the subject card index.

Publications.—The current volume of the ANNALS OF THE MISSOURI BOTANICAL GARDEN, which is our principal exchange for publications of scientific institutions and societies, contains 368 pages, 22 plates and 74 text figures, and consists of the results of botanical researches by individuals connected with the Garden. It is computed that the value per year of exchanges received for the ANNALS is about $1,500. Some exchanges are also received for the BULLETIN. Both the ANNALS and the BULLETIN are supplied to regular subscribers, and separates of the various articles in the ANNALS are for sale by the library. The cash receipts from subscriptions and separates for the year were $502.85.

Loans of Books.—While the library is not a circulating library, it does loan many books which are needed by investigators in other institutions. The borrower makes application for the loan through the library of his home university, which is responsible for return of the book at expiration of the loan and payment of transportation both ways. Loans of 80 books to 29 institutions have been made during the year.

Subject Index.—Work on the subject index of titles of botanical articles published by scientific societies of the world was continued during the greater part of the year. Indexing the serial publications of Great Britain and Ireland and nearly half of those of Germany and Austria had been completed by the end of 1916. During the present year cards have been prepared for botanical articles of nearly all the remaining scientific societies of Germany and Austria, but most of the cards of the present year have not yet been classified by the librarian. In all, about 18,300 articles are now indexed for 179 sets of publications.

Statistical.—There have been 499 volumes, valued at $940.55, and 697 pamphlets, valued at $149.00, donated to the library; and 337 volumes, valued at $957.94, and 18 pamphlets, valued at $19.39, purchased. The library now

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contains 35,364 books and 45,712 pamphlets, a total of 81,076, valued at $121,380.51. There are also 326 manuscripts, valued at $1,603.25, 920,929 index cards, valued at $9,281.85, and 162 maps, valued at $258.60, making the total estimated value of the library and card catalogue $132,524.21. A total of 33,584 index cards have been added, of which 19,831 were typewritten by Garden employees, and 13,753 purchased at a cost of $181.76. The number of books bound was 201, and 5 maps were donated, valued at $2.00.

STATISTICAL INFORMATION FOR DECEMBER, 1917

GARDEN ATTENDANCE:

Total number of visitors 9,451

PLANT ACCESSIONS:

Total number of plants and seeds received as gifts 6

LIBRARY ACCESSIONS:

Total number of books bought 8

Total number of books and pamphlets donated 140

HERBARIUM ACCESSIONS:

By Purchase—

Canton Christian College—Plants of southern China 105

Paul C. Standley—Plants of Florida, collected by Miss Jeanette P. Standley 95

By Gift—

Dr. R. P. Burke—Fungi of Montgomery Co., Alabama 70

J. A. Drushel—Plants of Ohio, Missouri, Texas, and Colorado 17

Miss Caroline C. Haynes—Hepaticae of New York and New Jersey 20

New York Botanical Garden—Thelephoraceae from various localities 700

Dr. L. O. Overholts—*Stereum rameale* from Maryland 1

Edwin B. Payson—Plants of Colorado, Wyoming, Idaho, and California 451

C. V. Piper—*Exobasidium Vaccinii* on *Xolisma ferruginea* from Florida 1

Dr. Mary S. Young—*Symphoricarpos sp.* from Texas 1

By Exchange—

California Academy of Sciences—Plants, chiefly from California 75

Ira W. Clokey—Plants of Colorado, mostly *Senecio* 30

Field Museum of Natural History—Plants of Indiana, Illinois, Oregon, etc 731

By Field Work—

Ernest J. Palmer—Plants of Texas, Oklahoma, Arkansas, and Missouri (estimated at) 8,500

10,797

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The Garden is open to the public every day in the year, except New Year's, Fourth of July, Labor Day, and Christmas—week days from 8:00 A. M. until one-half hour after sunset; Sundays from December to April, 1:00 P. M. until sunset, from April to December, 2.00 P. M. until sunset.

The main entrance to the Garden is located at Tower Grove Avenue and Flora Boulevard, on the Vandeventer Avenue car line. Transfer south from all intersecting lines.

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Volume V, Number 1, of the Annals of the Missouri Botanical Garden has appeared during the month, with the following contents:

"Rhizopogon in North America," S. M. Zeller and Carroll W. Dodge.

"Monograph of the North and Central American Species of the Genus Senecio—Part II," J. M. Greenman.

STATISTICAL INFORMATION FOR MARCH, 1918

GARDEN ATTENDANCE:

Total number of visitors	20,550

PLANT ACCESSIONS:

Total number of packets of seeds received in exchange	211
Total number of plants and seeds received as gifts	103

PLANT DISTRIBUTION:

Total number of plants and seeds distributed in exchange	116

LIBRARY ACCESSIONS:

Total number of books and pamphlets bought	28
Total number of books and pamphlets donated	103

HERBARIUM ACCESSIONS:

By Purchase—	
B. F. Bush—Plants of Missouri	488
Rev. John Davis—Plants of South Carolina	117
Rev. John Davis—Plants of California	89
By Exchange—	
College de Longueuil, by Bro. Marie-Victorin—Plants chiefly from Quebec, Canada	374
University of Wisconsin, by Dr. J. J. Davis—"Fungi Wisconsinenses Exsiccati," Decade V, Nos. 41–50, inclusive	10
By Gift—	
B. F. Bush—Plants of Missouri, collected by Rev. John Davis	101
Mrs. Joseph Clemens—Fungi of Oklahoma and Texas (24), and one specimen of *Polypodium sp.* from Borneo	25
J. A. Drushel—Plants of Colorado and Utah	4
John Macoun—Polyporaceae of British Columbia	43
Geo. L. Moxley—Plants of California	16
Dr. J. R. Weir—Fungi from Montana	11
TOTAL	1,278

The Garden is open to the public every day in the year, except New Year's, Fourth of July, Labor Day, and Christmas—week days from 8:00 A. M. until one-half hour after sunset; Sundays from December to April, 1:00 P. M. until sunset, from April to December, 2.00 P. M. until sunset.

The main entrance to the Garden is located at Tower Grove Avenue and Flora Boulevard, on the Vandeventer Avenue car line. Transfer south from all intersecting lines.

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Mycologist and Librarian.

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HARVARD ... LANDSCAPE ARCHITECTURE

MISSOURI BOTANICAL GARDEN BULLETIN

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MISSOURI BOTANICAL GARDEN BULLETIN

VOLUME VI
WITH 24 PLATES
1918

ST. LOUIS, MISSOURI
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Missouri Botanical Garden Bulletin

Vol. VI St. Louis, Mo., December, 1918 No. 10

SOME EARLY HISTORY OF THE GARDEN

In looking up data regarding some of the collections in the herbarium, some interesting facts concerning the early history of the Garden were discovered, of which it seems worth while making a permanent record.

Mr. Shaw was an omnivorous reader and spent a great deal of time hunting for information about the plants growing in the Garden. Much of this is in scattered notes, and these notes were later gathered together in two manuscripts, one called "Guide to the Missouri Botanical Gardens" and the other "A guide to the trees and shrubs in the arboretum of the Missouri Botanical Gardens." The latter paper was unfinished. In it a short description of the land now occupied by the Garden is given as follows:

> "When the writer first visited these grounds in 1820, they were called 'La Prairie de la Barrière à Denoyer' from Louis Denoyer who formerly lived at, and kept, the gate of the fence (barrière), by which the commons of the old village of St. Louis were surrounded. For a distance of nearly two miles from where Tower Grove Park is now laid out to Taylorwich Station, or rather the pond still existing there [1875], no trees were growing except two or three venerable cottonwoods (*Populus canadensis*) in the low ground, on the watercourse running to Rock Spring and thence to Chouteau's Millpond; on this small watercourse were a few plants of the *Nymphea odorata* Ait., sweet-scented water lily, and a clump of hazel bushes on the rising ground, where the grove at the Garden now exists. The prairie was grown over with a tall natural grass, Andropogon, prairie grass, with an occasional patch of the wild strawberry (*Fragaria Virginiana*), of which neither a tuft of the grass nor a plant of the strawberry can now be found. There were no residences in sight nor any to be seen on the narrow road passing Rock Spring to St. Louis till coming to the stone dwelling of Mr. John B. C. Lucas, on the street now called 7th Street, and the house and garden of Mr. Joseph Charles Sen, now 5th and Market Streets, where he was the first to cultivate the grape vine (Isabella) at St. Louis, and a zealous planter and protector of shade trees."

In the "Guide to the Missouri Botanical Gardens" a fuller history of this land is given. Mr. Shaw acquired the prop-

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erty by purchase from Thomas Jefferson Payne, in 1840. Payne had laid out a race track, the center of which was in a grove of trees. Near the grove Mr. Shaw built his house with a tower and called it Tower Grove. This was his country home and became his favorite spot. Like all Englishmen of wealth, he believed in having a town house as well as a country house, so the town house was built on Seventh and Locust Streets, in 1851, two years after the completion of Tower Grove.

Shortly after purchasing this property, Mr. Shaw went to Europe, and most of his time during the next ten years was spent in visiting different places of interest on the Continent, Constantinople and Egypt. The idea of establishing a garden came to him during this time. Among interesting papers left by him is a sheet entitled "List of places worthy of notice," in which is given a list of thirteen places, with addresses and directions as to how to reach them, in Mr. Shaw's own handwriting. The thirteen places are all gardens or nurseries. Mr. Thomas Dimmock, in a biographical sketch of Mr. Shaw,[1] says that Mr. Shaw told him that "it was while walking through the grounds at Chatsworth—the most magnificent private residence in Europe—that the fruitful idea first dawned upon him. He said to himself: 'Why may I not have a garden, too? I have enough land and money for something of the same sort in a smaller way.'" In the "Guide to the Missouri Botanical Gardens" Mr. Shaw says that the idea of starting the Garden came "during his travels in Europe from 1840 to 1850." Observing the great attention paid to public parks and gardens in England, France, and Germany and the high esteem in which these institutions were held by the people of those countries, he conceived the idea of founding a Missouri Botanical Garden, for which the grounds, ample in extent and in close vicinity to the future great city of the west, were so appropriate. The plan of the Garden was determined on, drains constructed, and the wall surrounding the same commenced in 1855.

Dr. George Engelmann, one of the foremost botanists in America, resided in St. Louis, and Mr. Shaw went to him with his hopes and his plans. Dr. Engelmann was studying cacti and various other groups of plants and had started a small garden near his home. He encouraged Mr. Shaw in every way possible, selected botanical books for him to study and gave him his first introduction to scientific botany. When Dr. Engelmann went to Europe in 1856 he was commissioned by Mr. Shaw to buy books and other things

[1] Mo. Bot. Gard. Rept., vol. 1, p. 12, 1890.

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needed for the Garden. In a letter[1] dated October 18, 1856, he wrote to Dr. Engelmann, then at Kew, saying, "Get all the plans and catalogues you conveniently can. My mind is intent on the undertaking which I am anxious to commence, and by dint of reading and observations am endeavoring to gather up some crumbs of botanical science." Apparently his first idea had been to get only such as he needed himself, for in this same letter he states, "Hope you will not give yourself much trouble in the seeking of these works, as you might probably find some others equally or more suitable to my object—that is, to acquire a knowledge of botany and horticulture myself and diffuse a taste for the same among others. In the purchase of books, you can go to the amount of one hundred dollars."

Dr. Engelmann was then at the Kew Gardens and he interested Sir William J. Hooker, the Director, in Mr. Shaw's Garden. On August 10, 1857, Sir William Hooker wrote to Mr. Shaw[2] that "very few appendages to a garden of this kind are of more importance for instruction than a library and an economic museum, and these gradually increase like a rolling snow-ball." This letter and Dr. Engelmann's influence seem to have decided Mr. Shaw to start a botanical library and museum. In a letter to Dr. Engelmann,[1] dated September 15, 1857, he says, "As to the botanical library, if you will have the goodness to send me a list of such works as you consider the most essential, I will select from them what may appear to me most useful for the present. As to the herbarium you mention of Prof. Bernhardi, if it is in good order you can purchase the same at the price you mention ($600)."

The Bernhardi herbarium was bought three months later and at a lesser figure, as is shown by the following receipt:

"Leipzig, Saxony, Dec. 18, 1857.

"Mr. Henry Shaw at St. Louis
"to Theodor Bernhardi agent.
"to the Herbarium or collection of Plants of the late Prof. Joh. Jac. Bernhardi of Erfurt, consisting of 374 packages (said to contain about 40,000 species) of dried plants.
"Prix dollars 400.

"Recd. Pay't. by Dr. George Engelmann.

"Theodor Bernhardi."

The letter from Dr. Engelmann to Mr. Shaw telling about the herbarium cannot be found, but apparently the collection was not fully labeled, as he writes,[1] on January

[1] Engelmann letters, vol. S, in Mo. Bot. Gard.
[2] Mo. Bot. Gard. Rept., vol. 1, p. 13. 1890.

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13, 1858, "if possible, my dear Sir, by all means get the deficient labels to them; perhaps the cost would be considerable, but then what an advantage to have them complete. I should not regret the expense—it could not be done probably in St. Louis except by yourself and then you will be otherwise occupied. The list of books has my best attention. . . . I have all Loudon's works except his Gardeners' Magazines 1st and 2nd series which I should very much like to have. They contain valuable information to persons like myself devoted to horticulture and planting."

The next letter,[1] dated May 18, 1858, refers again to the Bernhardi herbarium: "I submit with due deference to the opinion of yourself and learned friends as to labeling the plants of the Bernhardi herbarium. . . . Am now vigorously at work on the building of the Hort. Bot. Missouriensis."

The details of the Garden, planting, etc., occupied most of Mr. Shaw's time. In the letter quoted from previously, September 15, 1857, he speaks of the early work done in the Garden:

> "Some of the seeds you sent me from Berlin came up and flowered: most of them were annuals; more seeds of perennial trees and hardy shrubs would be acceptable. The garden is all trenched over 2 ft. deep (cost $1,000) and is in fine order for planting anything—two large tanks, 10,000 gals.—two wells with a main drain arched with stone and large and deep. The drains and tanks cost $2,000.00. Am now building the walls of stone and brick; two sides will be finished in 60 days at a cost of $6,000. The west or entrance side, I intend to build next year and also the plant houses, so that you see I am by no means idle. If I attempt too much at once, I should make a fatigue of a pleasure. The museum and library must be built after the plant houses—say in 1859. I intend to have everything substantial and elegant but on a small scale. I shall commence the ornamental planting next spring, the botanical arrangements afterwards. All this I am doing according to my own ideas gathered from horticultural works of Loudon, McIntosh, etc.—no one here can give me the least information. How can I obtain dried specimens of seeds, fruits, and woods of tropical growth as at Kew? A good collection in this way would be among the most interesting and instructive things we could have. . . . I take a great and increasing pleasure in my undertaking and am devoting myself almost entirely to it. I shall have a plan made of the grounds as well as of the whole of my Tower Grove estate and send a copy to Sir Wm. Hooker for his inspection and advice."

In the letter of January 13, 1858, also previously quoted from, he writes more of the work done in the Garden:

> "I am employed every day in my great undertaking—I may say every hour in the day. Good and substantial stone and brick drains are made in every part of the ground. The stone wall on

[1] Engelmann letters, vol. S, in Mo. Bot. Gard.

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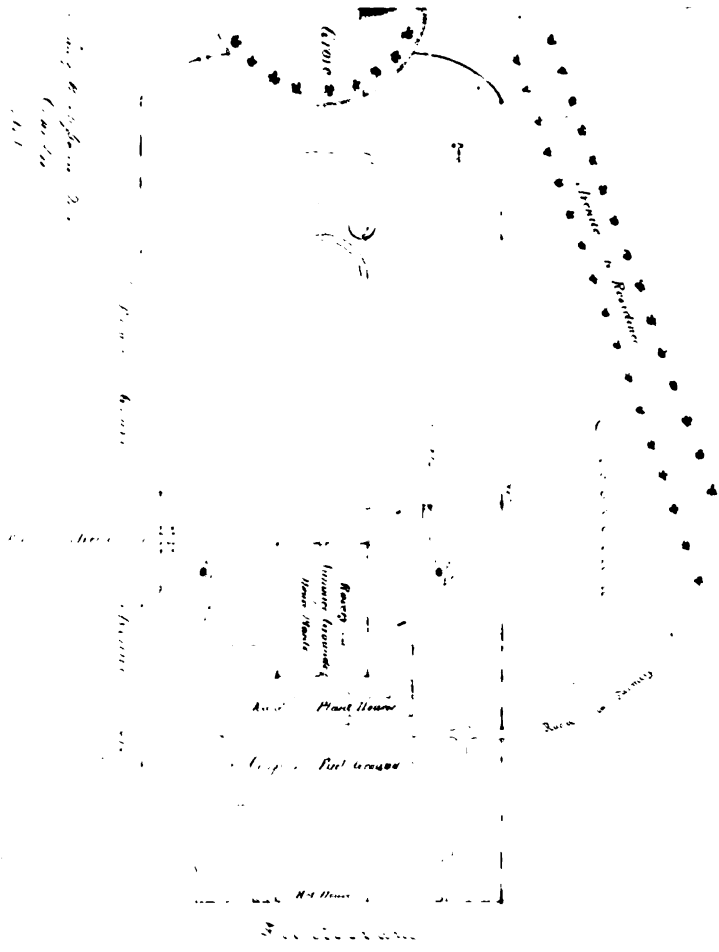

PLAN OF GARDEN PREPARED BY MR. SHAW, IN 1858.

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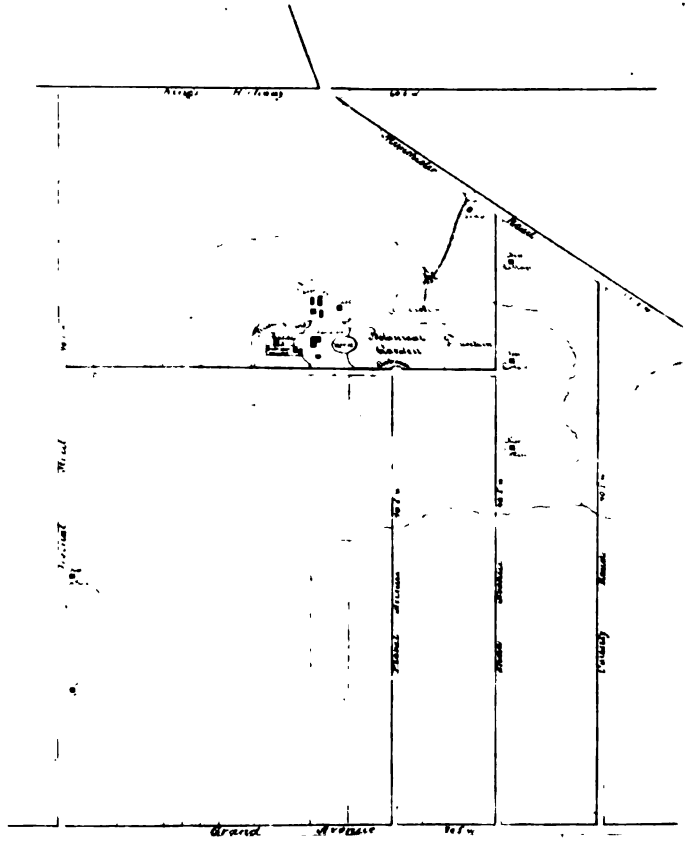

Plat of Land and Buildings entered to be sold for the benefit of the Missouri Bot. Garden by the founder Mo.

> the west side and the brick wall coped with stone on the north sides are finished at a cost of 8,000 dollars. I am now proceeding with the entrance gate and lodge on the eastern front, which with the stone walls and iron railing I estimate to cost not much short of $10,000—all substantial and elegant. At the same time I shall commence the plant houses (150 feet) against the north wall (one of the compartments I intend for cacti and succulent plants), also the rosarium or sunk parterre, which together with the plant houses will cost about $5,000. These buildings with some planting of trees and shrubs and fencing Tower Grove and Shaw Avenues and building two brick cottages will be my work for the present year, 1858. I enclose you a plan of the garden and the lands intended to endow the same, in amount more than 600 acres. . . . I feel quite competent to the building of plant houses suited to this climate, as regards construction, heating and ventilation, theoretically from books and six years' experience in my private garden. . . . I have sent plans to Prof. Gray and Sir W. Hooker, and with many thanks for your pains and exertions."

Dr. Engelmann returned to St. Louis in 1858 and took an active interest in the Garden until his death. He likewise interested Dr. Asa Gray in the project, and in 1859 Dr. Gray wrote,[1] saying, "Shaw has just written and I have replied expressing a lively interest in his projected establishment and offering my best services if he requires them in the way of advice or suggestion."

The gateway was erected in 1858 from a design of George I. Barnett.[2] The museum and library building was finished in 1860, and the Bernhardi herbarium, the library, and many things collected by Dr. Engelmann[3] in Europe were put in place. The Bernhardi collection consisted of approximately 70,000 specimens. At Dr. Gray's and Dr. Engelmann's suggestion, August Fendler was employed as a sort of curator in the Garden and museum.[4] He began work for Mr. Shaw on October 12, 1860, at $1.00 per day, and worked for him about a year and a half, according to Mr. Shaw's private cash book. His chief work seems to have been the arrangement of the Bernhardi, Riehl, and other collections in the museum.

According to the plans adopted in 1858, the Garden was divided into three large divisions, containing about 60 acres altogether:[2]

> "1st, The Garden proper, containing the plant houses for tropical and other plants requiring protection, the herbaceous ground with plants scientifically arranged and named, and the cacti in the north end of the Garden next the wall.
>
> "2nd, The Fruticetum for shrubbery and experimental fruit gardens.

[1] Engelmann letters, vol. G, in Mo. Bot. Gard.
[2] MSS. Guide to Missouri Botanical Gardens, by Henry Shaw.
[3] Trans. Acad. Sci. St. Louis, vol. 1, p. 316. 1857.
[4] Letters from Dr. Engelmann to Dr. Parry, Jan. 24, 1861.

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"3rd, The Arboretum, containing a collection of trees, comprising all that will grow in the open air in this climate and locality; a Pinetum for the Pine Family, a Quercetum for oaks and a Salicetum for willows."

The arboretum was started in 1860, and this part of the Garden received much personal attention from Mr. Shaw. The trees were mostly planted in rows, and many of them were measured each year to get the rate of growth. Unfortunately, many of them were blown down by a tornado in 1896.

Dr. Engelmann went to Europe again in 1868, and Mr. Shaw writes to him eagerly asking for more plants, seeds and specimens for the museum. In fact, Dr. Engelmann did more for the Garden and museum than anyone else, except Mr. Shaw himself. In 1868, the plants having outgrown the original plant houses, Mr. Shaw writes[1] that a palm house with additional wings for "moist store and temperate house" was built near the center of the Garden. Another letter, written January 24, 1869, tells of more changes:

"Since I addressed you last, I have brought the plant houses to a finish, removing those that stood against the wall and putting them in range with the Palm House. The heating apparatus answers beyond my expectations. . . . The learned Agassiz was here last October and was much pleased with our garden. He promised some leaves and fruits of Amazonian palms for our Museum. The garden was visited by increased numbers the past summer. I think not less than 40 to 50 thousand. I do wish we had something more interesting and instructive for the inspection of such multitudes."

Orchids now began to demand attention, and the Garden collection was started by a gift from Mrs. Henry T. Blow of the orchids collected by her in Brazil. From that time on, orchids have been one of the favorite display plants in the Garden.

In 1882, the plants having again outgrown their quarters, a larger house was built and "dedicated to Linnaeus by placing his bust over the entrance."[2] This is the Linnean House and the only one of the plant houses built by Mr. Shaw that still remains.

The Garden has always been open to visitors and for many years registers were kept, most of which are still in the possession of the Garden. The first one says on the title page:

"Visitors to Tower Grove and the Botanical Garden are respectfully requested to write their names.

"Henry Shaw."

[1] Engelmann letters, vol. S, in Mo. Bot. Gard.

[2] MSS. Guide to Missouri Botanical Gardens, by Henry Shaw.

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The first page bears the inscription "Commencing June, 1859," also in Mr. Shaw's handwriting. Several hundred visitors to the Garden registered that year and many more the following year. In 1880, Mr. Shaw wrote:

"The Gardens have been visited by eminent men of science, among whom Sir Joseph Hooker, Director of Kew Gardens, Prof. Asa Gray, the late Prof. Agassiz, and the celebrated plant collector Roesl, now in South America, and others, who have warmly encouraged the proprietor in his exertions in collecting and bringing forward the plants, shrubs, and trees to their present state of growth. He has had much aid by the contributions and councils of Dr. Geo. Engelmann and the approbation of the citizens of St. Louis and the public in general, who visit the Gardens in increasing numbers. It is computed that a million or more people have seen the Garden since its first opening in 1860."

Dr. Engelmann died in 1885, and Mr. Shaw, wishing to commemorate his memory, called Dr. Asa Gray in consultation, with the result of the founding of the Henry Shaw School of Botany and establishing therein the Engelmann professorship of botany. The very valuable herbarium of Dr. Engelmann and his library were given to the Garden by his son, Dr. George J. Engelmann, and formally accepted by the trustees on October 14, 1889.

Finally, it may be of interest to add a list of the rules which were considered necessary by Mr. Shaw when the Garden was opened:

"1. Smoking, or eating and drinking or the carrying of provisions of any kind into the Gardens are strictly forbidden. No dogs can be admitted.

"2. No packages or parcels, bags or baskets are allowed to be carried into the grounds. All such must be deposited at the Gate of Entrance, while the owners make the tour of the Gardens.

"3. No person attired otherwise than respectably can enter, nor children too young to take care of themselves, unless a parent or suitable person be with them. The police (when there) have orders to remove such, or also persons guilty of any kind of impropriety. When large schools are admitted, they must be accompanied by a requisite number of Tutors and in accordance with the rules of the Gardens.

"4. It is by no means forbidden to walk upon the grass walks; still it is requested that preference be given to the gravel paths, and especially that the lawn edges, parallel to the walks be not made a foot way, as nothing renders them more unsightly. It is scarcely needful to say that all play, leaping over beds, running on the grass and slopes are prohibited. The Gardens are intended for agreeable recreation and instruction, not for idle sports.

"5. It is requested that visitors will refrain from touching the plants and flowers; a contrary practice can only lead to suspicion, perhaps unfounded, that their object is to abstract a plant or flower, which when detected must be followed by expulsion.

"6. In entering the plant houses, it is particularly requested that visitors will keep to the right; if they do otherwise, they

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will pass each other, which the narrowness of the walks renders difficult, and this must occasion inconvenience to all parties and often injury to the plants."

ADDITIONAL INFORMATION RELATIVE TO THE WORKS OF ART CONTRIBUTED BY HENRY SHAW

Since the publication of the article in the September, 1918, BULLETIN on "Henry Shaw's Contribution to Art in St. Louis" certain additional letters from the artist Miller have been found which throw further light upon the history of these statues. It is believed that the matter is of sufficient interest to warrant the printing of the letters which follow:

"Munich, November 20th, 1875.

"Dear Sir:

"I herewith send you the sketch of the great poet Shakespeare, but let me again tell you that they are only rough sketches, merely made to give you an approximate idea of what I am willing to make; the same is to be said of the Humboldt sketch, which appears too short on the photograph. My idea was not to represent Shakespeare as an enthusiast or an ideal poet, but as a man of action, who knew mankind. In the right hand I gave him a pen; on the column lays a sheet of paper on which a passage of one of his works could be engraved. The pedestal is in the style of his time, on the front of which we could put the name 'Shakespeare the great poet' and on the three sides reliefs; the corners would be decorated with emblems representing 'tragedy, comedy, etc.' below Acanthus leaves. I repeat that the design could be made so exact that they would have no trouble whatever to execute the stone work in America. The cost of these bronze ornaments on the pedestal would be about 1800 dollars. I would like very much to have the pedestal executed in this way. It would then be a monument where the pedestal corresponds with the figure and stands in perfect harmony.

"Although the Shakespeare statue in New York is very fine, I do not think that the pedestal suits it very well. Should the sum that you have fixed not be sufficient for the bronze decoration on the pedestal, we must, of course, then do without it. I have given you the costs as cheap as possible in the interest of the matter and hope that the reputation of our establishment will give you sufficient guarantee for the very best execution of the work. Hoping that I shall be able to follow all your desires, I am,

"Yours very respectfully,

"F. v. Miller."

"Munich, December 29th, 1876.

"Dear Sir:

"I cannot let the old year pass by without sending you my best wishes for the coming new one.

"Your kind letter of November 18th was very delightful to me, as it gives me the satisfaction that you are contented with every-

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thing that I have made. I hope that it will be so for the future and you and everybody will enjoy the two monuments.

"With the Humboldt relief I shall do as you desire and make the volcanoes smoking. It was only a small wax sketch that I sent to you, wherein it is not possible to give the effect as it would be in the large relief. On the other side I shall put palm trees, which, though, must not be out of proportion on account of the other relief.

"If you allow me I shall not send you the sketches of the other reliefs, as this makes me lose so much time waiting for the answer and I believe that you can depend that everything will be all right. I knew that the pedestal would look well and I am very thankful to you that you have followed my advice.

"Shakespeare is in the foundry already. You will receive him first, as I have only commenced modeling Humboldt a short time ago. Lady Macbeth is finished. Falstaff, I am just working at. I am trying to get the portrait likeness of Ben deBar as near as possible, although it is very difficult, as the beard, etc., will always spoil it, but I hope it will be very good.

"I have regretted very much that you did not allow me to place your medallion on the back of the Humboldt monument, but just as you like. Is the front side of the stone as I put it down here polished, that is where the inscription will be fastened to the stone every single letter? I shall send the exact instructions about that later, as well as about the fastening of the bronze reliefs and the statues; iron cannot be employed for it, for iron will rust and the rust would always run down the pedestal.

"Shakespeare will be shipped by the end of May if the casting succeeds, and also the reliefs. Humboldt cannot be completed before late in the autumn. You will be surprised that it takes so long a time, but if I tell you that I model all alone and have nothing done by a stranger, for the purpose of being sure that everything is well done, you may have an idea how hard I worked until now and how much I have yet to do to be able to give you the pleasure of bringing you soon in the possession of the two monuments. With kindest regards

"Yours very truly,

"F. v. Miller."

"Munich, February 20, '77.

"Mr. Henry Shaw, St. Louis:

"Although I did not get any news from you since my last letter, I wish to send you the photograph of the Hamlet relief sketch and would be obliged to you if you give me your opinion on it immediately. Macbeth and the Queen Katherine are mostly finished, and I shall send you the photographs of them in a few days. With Queen Katherine I had great difficulties to find an appropriate scene for the small space and so I chose the moment when she leaves the throne supported by her Patience. I think it will please you.

"The relief of the Chimborazo and a palm landscape are also almost finished. You will receive from me a paper cut in some days, showing the size of the Shakespeare relief and one for Humboldt; it is the exact size of the bronze reliefs and will you be so kind as to hold these papers to the stone, but into every frame and you will then see if everything fits. The measure of the Shakespeare plinth is also inclosed in the package. Please to

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place the same on the top of the plinth and let me know immediately if all is right, so that if there is anything to alter it can still be done here.

"I would like to know the exact depth of the space where the reliefs are to be set; it must be at least two centimetres commencing with the frame.

"With many kind regards and hoping to hear from you, I am,

"Yours very respectfully,

"F. v. Miller."

"Munich, November 2, 1877.

"Dear Sir:

"The day before yesterday I have sent you my last letter and today I receive yours of October 14th; you may imagine how astonished I was. Your wishes cannot be satisfied any more. The reliefs of Humboldt are entirely completed; some parts of the statue itself are already cast, the others are being molded. The cost to the entire completion may yet be 2000 dollars; if it is not going to be completed 4500 dollars will be lost, because almost nothing of the work can be used. The model is cut in pieces and lays in the mold; the mold is worthless if nothing is to be cast into it.

"I cannot agree with your last opinion, that Humboldt should, through the progress of science, be put in the background. I rather find the inscription that you want to have engraved on the monument, which says, 'In honor of the most accomplished traveller of this or any other age' very correct and I am sure that this will be true for all times. Humboldt will for science always remain the second discoverer of America. And how little they think in our country that Humboldt should be less esteemed in the future is shown by the fact that in Berlin a monument is going to be erected for the great discoverer for the price of 'one hundred thousand marks.'

"I must confess that if you had asked me before Humboldt was finished if Columbus or Humboldt, I also would have pleaded for Columbus. He is the man who has discovered America, and is therefore more popular for the great mass. But Humboldt's merits are only known by the learned men and his theories are the foundation for a new science. Just imagine how disagreeable it would be for me if Humboldt almost finished would not be erected. Even if no material damage would result for me, how happy is the artist whose work finds the general admiration and satisfaction. No one would believe the real cause, the more as the generous idea of a noble American citizen is known to a large extent and the work itself generally admired.

"My proposition would therefore be if you will in no case erect the Humboldt as a pendant for Shakespeare to put the same in your Missouri Botanical Garden or in any other place, or else even, this would be very sad to me, sell it to any other city or museum. I believe that the sum for the monument without the pedestal is so small that you would have no difficulty in selling a work of art like this; for without praising myself I can say that it is a success in every respect. I shall then make a Columbus for you for the same amount of money that I asked for late Humboldt. The best would, of course, be to put Humboldt on his old place in the park and you have a Columbus made for some other place, but larger than these two statues are, for Columbus has a great

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meaning for America. If you make a present of the figure and the city or somebody else of the pedestal your idea could easily be carried out. I am sure that there are plenty of fine places left for Columbus in Tower Grove Park.

"To my great sorrow I heard that Ben deBar is dead. I had wished that he could have seen my works, for he had a very correct judgment. It is possible that you found his likeness not very resemblant. It is rather difficult to strike any one's likeness in a strange costume and after a photograph, but you will find that the relief is more resemblant than the photograph that I have sent to you. I hope you will be satisfied with the portrait medallion of yourself. At least I think that it is very much like you.

"Please let me soon have news from you and deliver me from the anxiety in which your last letter has put me. With many kind regards, I remain dear Sir,

"Yours respectfully,

"F. v. Miller."

"Munich, January 2, 1878.

"Dear Sir:

"Many thanks for your kind letter; it delivered me from the painful uncertainty whether I had worked a whole year for nothing or not, for it is a loss in an artist's life to destroy a successful piece of work.

"But, that it is impossible to change a statue that must have the portrait likeness not only in face but also in the whole countenance into an entirely other one, will be comprehensible even to a layman. On the other hand, I was very sorry not to be able to fulfil your wish; you mention Rafael's Ascension as an example how the artist should be able to content all wishes, but this is quite different from our case, for there it was the problem to compose an entirely new work.

"To prove this I send you herewith a photograph of the colossal plaster model of Humboldt and the photograph of Columbus as Mr. Probasco of Cincinnati had him painted by the celebrated painter and director of our Academie of fine arts, Mr. Piloty, and you will find that I am right. I don't mean that I find faults in the conception of Columbus by Piloty, but in comparing the two you will find that I would have had to destroy the Humboldt statue before making a new work.

"I would, of course, be very happy to execute the Columbus statue, for it would be an excellent problem to reproduce so grand a figure in the picturesque costume and I would be satisfied to fix the terms of payment at your convenience as far as my means go; send me only one word and I shall remit you sketches, which surely will find your contentment. The Shakespeare statue will probably be in your possession by this time; if you, as I hope, are pleased with it and everything is in good condition, I would be quite thankful to you if I could get the agreed sum for it; I had so many expenses for the bronze cast, and the want of money in our country is yet greater than in America. The relief of Hamlet has been packed today and sent off by rail.

"The insurance is made for only 5000 dollars, because if any accident should happen, I am yet in possession of the plaster model and could execute the whole with reliefs again for the above sum.

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My expense for the insurance is: *130 Marks 25 Pfenige.* With many kind regards and my best wishes for the new year, I am as ever,

"Yours very respectfully,

"F. v. Miller."

"B. P. The Shakespeare statue has been shipped on deck from Hamburg to Havre, and it may be that the figure has received green spots by the sea water. Such spots can easily be removed with pulverized red tartar or else with pulverized pumice stone in water. Please let me know if the front of the Humboldt pedestal is polished; if not I shall put the name on a bronze plate."

"Munich, April 30, '83.

"Dear Mr. Shaw,

"Today I have posted a small sketch of the pedestal of Columbus; I have drawn Columbus upon it at the same time, but only very hastily. Jointly I send you a larger drawing of the pedestal to enable you to inquire about the expense. The relievo follows. I am working at the sketch of your grave monument at present and in order to give you an approximative illustration about the appearance of the ensemble, I shall have it photographed. The photograph of the pedestal is also from a sketch which I have made already.

"Expecting a speedy answer and hoping you to be in good health, I am with best regards,

"Yours respectfully,

"F. v. Miller."

"Munich, Erzgiesserei, May 19, 1883.

"Dear Sir:

"Your favour of 26th past and also the drawing came to hand. The bust of Beethoven is already commenced. I would, however, request you to let me know whether the pedestals are round and whether the base on which the bust will get placed is round or angular according to the enclosed drawing, as the foot of the bust is to be made to conform to it. Should the pedestal not yet be made I would take the liberty to send you a drawing with some variations on the pedestal which I think desirable, at least on the upper consoles. The photograph I am expecting.

"With kindest regards I remain, dear Sir,

"Yours very faithfully,

"F. v. Miller."

SAVORY HERBS

Savory, or culinary, herbs are aromatic plants used to add flavor to various cooked products. Most of them are readily grown and should more frequently find a place in small gardens than they do at present. Not only does their aroma add to the palatability and variety of the ordinary diet, but certain condimental properties aid in digestion. Plants, like rue, stimulate the appetite and thus form a part of beverages which are used as appetizers. Others, like pars-

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ley, are used merely for garnishing, while various oils employed in perfumery are yielded by a number of herbs.

The following table indicates the herbs grown last summer in the economic garden, with their uses and methods of propagation:

COMMON NAME	BOTANICAL NAME	USE	PROPAGATION
Angelica	*Archangelica officinalis*	Stem and leaves as salad; seeds for flavoring	Seeds during late summer
Anise	*Pimpinella Anisum*	Leaves as garnish; seeds and oil for flavoring and perfumes	Seeds in early spring
Balm	*Melissa officinalis*	Foliage for flavoring and salad; oil for perfumery and beverages	Division, cuttings, seeds
Basil	*Ocimum Basilicum*	High seasoning; oil for perfumery	Seeds in spring
Borage	*Borago officinalis*	Foliage as salad, garnish, or flavoring	Seeds in spring
Caraway	*Carum Carvi*	Herbage as salad; roots as vegetables; seeds as flavoring; oil for perfumery	Seeds in spring
Catnip	*Nepeta Cataria*	Condiment	Seeds in spring
Chervil	*Anthriscus Cerefolium*	Leaves for seasoning	Seeds
Chives	*Allium Schoenoprasum*	Flavoring	Bulbs or division
Clary	*Salvia Sclaria*	In making wines	Seeds
Coriander	*Coriandrum sativum*	Seed in confections, condiments, beverage flavoring	Seeds
Cumin	*Cuminum odorum*	Flavoring in pickle, pastry, soup	Seeds
Dill	*Anethum graveolens*	Seeds as seasoning for pickle; oil for perfumery; vinegar as condiment	Seeds
Fennel	*Foeniculum vulgare*	Herbage for garnishing and flavoring; seeds in beverages and confectionery; oil for perfumery	Seeds
Horehound	*Marrubium vulgare*	Confectionery	Seeds
Hyssop	*Hyssopus officinalis*	Salad; oil in preparation of soap	Division, cuttings, seeds
Lavender	*Lavandula angustifolia*	Flowers and oil in perfumery; condiment	Division or cuttings
Marigold	*Calendula officinalis*	Flowers as seasoning, butter coloring	Seeds
Marjoram	*Origanum vulgare*	Seasoning; oil in perfumery	Division or cuttings
Mint	*Mentha spicata*	Seasoning	Division or cuttings

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COMMON NAME	BOTANICAL NAME	USE	PROPAGATION
Parsley	*Petroselinum hortense*	Seasoning, garnish	Seeds
Penny-royal	*Mentha Pulegium*	Seasoning	Division
Pepper-mint	*Mentha piperita*	Flavoring, perfume in soap	Division
Rose-mary	*Rosmarinus officinalis*	Seasoning; oil in perfumery	Cuttings or seeds
Rue	*Ruta graveolens*	Seasoning, flavor in beverages; oil in perfumery	Division, cuttings, seeds
Sage	*Salvia officinalis*	Seasoning; oil in perfumery	Division, cuttings, seeds
Savory, summer	*Satureia montana*	Seasoning	Seeds
Savory, winter	*Satureia montata*	Seasoning	Division, cuttings, seeds
Tansy	*Tanacetum vulgare*	Seasoning	Division, cuttings, seeds
Tarra-gon	*Artemisia Dracunculus*	Seasoning, salads, decoction in vinegar; oil in perfumery	Division, cuttings, seeds
Thyme	*Thymus vulgaris*	Seasoning; oil in perfumery; oil crystals as disinfectants	Division, cuttings, seeds

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STATISTICAL INFORMATION FOR NOVEMBER, 1918

GARDEN ATTENDANCE:

Total number of visitors 14,204

PLANT ACCESSIONS:

Total number of plants and seeds received as gifts 6
Total number of plants received in exchange 32

PLANT DISTRIBUTION:

Total number of plants distributed in exchange 57
Total number of seed packets distributed in exchange 1

LIBRARY ACCESSIONS:

Total number of books and pamphlets bought 13
Total number of books and pamphlets donated 5

HERBARIUM ACCESSIONS:

By Purchase —

Canton Christian College—Plants of China 116
A. D. E. Elmer—Plants of the Philippine Islands 2,146

By Gift —

Walter H. Aiken — *Leucophyllum texanum* Benth. from Texas 1
J. A. Drushel—Plants of the central and western United States 26
Dr. W. G. Farlow—Fungi of Massachusetts and New Hampshire 29
Prof. A. Yasuda—Thelephoraceae of Japan 35

By Exchange—

Arnold Arboretum — Plants of Alaska, collected by Miss Alice Eastwood 218
L. Rodway—*Isoetes* from Tasmania 3
U. S. National Museum—Photographs of type specimens in the Herbarium of the University of Oregon 7

TOTAL 2,581

The Garden is open to the public every day in the year, except New Year's, Fourth of July, Labor Day, and Christmas—week days from 8:00 A. M. until one-half hour after sunset; Sundays from December to April, 1:00 P. M. until sunset, from April to December, 2:00 P. M. until sunset.

The main entrance to the Garden is located at Tower Grove Avenue and Flora Boulevard, on the Vandeventer Avenue car line. Transfer south from all intersecting lines.

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